

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A distributed-feedback semiconductor laser, comprising:
an active region for generating the gain of a laser beam, ~~and~~
a diffraction grating formed in said active region, ~~and wherein~~
front and back surfaces between which said active region is interposed, wherein
~~the front end surface out of the front and back end surfaces between which said active~~
~~region is interposed~~ has a reflectivity of 1 percent or less,
~~the back end surface out of said two end surfaces~~ has a reflectivity of 30 percent or more
when viewed from the back end surface side toward the front,
the coupling coefficient κ of said diffraction grating is 100 cm^{-1} or more,
the length L of said active region is $150\text{ }\mu\text{m}$ or less, and
a combination of κ and L ~~so that these parameters provide~~ provides a $\Delta\alpha/g_{\text{th}}$ of 1 or more,
where $\Delta\alpha$ is the gain difference between modes and g_{th} is a threshold gain.
2. (currently amended): The distributed-feedback semiconductor laser as defined in claim 1
wherein the product of said coupling coefficient κ and said active region length L is at least 1 and
not more than 3.

3. (previously presented): The distributed-feedback semiconductor laser as defined in claim 1 wherein the active region length L is not longer than L_p where L_p is the length of the active region provided that the dependency of $\Delta\alpha / g_{th}$ on the active region length L is plotted and $\Delta\alpha / g_{th}$ is on a peak in value.
4. (previously presented): The distributed-feedback semiconductor laser as defined in claim 1 wherein said diffraction grating is a gain coupled structure or loss coupled structure, or
has a structure in which two or three out of the gain coupled, loss coupled, and refractive index coupled structures are mixed, or
is of a structure that is refractive index coupled and $\lambda / 4$ shifted.
5. (previously presented): The distributed-feedback semiconductor laser as defined in claim 1 wherein said diffraction grating has a structure that is refractive index coupled and $\lambda / 4$ shifted, and the $\lambda / 4$ shift position is at a distance backward from the front end of said active region by 75 percent \pm 5 percent where the longitudinal direction length of said active region is 100 percent.
6. (previously presented): The distributed-feedback semiconductor laser as defined in claim 1 wherein the back end surface of said active region is formed by etching, and the longitudinal direction length of the entire device including the distributed-feedback semiconductor laser is longer than 150 μm .

7. (original): The distributed-feedback semiconductor laser as defined in claim 6 wherein said device is so structured to include another function region integrated behind the distributed-feedback semiconductor laser through an end surface gap formed by said etching process.
8. (original): The distributed-feedback semiconductor laser as defined in claim 7 wherein said other function region has a light-receiving function.
9. (original): The distributed-feedback semiconductor laser as defined in claim 8 wherein the front end surface of said other function region is formed tilted relative to the back end surface of said active region.
10. (previously presented): The distributed-feedback semiconductor laser as defined in claim 7 wherein said other function region has a reflection function to said active region.
11. (previously presented): The distributed-feedback semiconductor laser as defined in claim 1 wherein the reflectivity of the back end surface of said active region is set to 90 percent or more.
12. (original): The distributed-feedback semiconductor laser as defined in claim 11 wherein the reflectivity of the back end surface of said active region is set to 90 percent or more by providing a high-reflection film on said back end surface.

13. (original): The distributed-feedback semiconductor laser as defined in claim 12 wherein a window that guides light out from said active region is formed on said high-reflection film.

14. (currently amended): The distributed-feedback semiconductor laser as defined in claim 1 wherein materials that constitute said active region comprise at ~~least~~ least one selected from the group of Al, N and Sb.

15. (previously presented): The distributed-feedback semiconductor laser as defined in claim 1 wherein the distributed-feedback semiconductor laser has a series resistance of 50 ohms \pm 10 ohms.

16. (currently amended): A distributed-feedback semiconductor laser array, ~~monolithically comprising an a monolithic array of the distributed-feedback semiconductor lasers, as defined in claim 1~~ wherein

each distributed-feedback semiconductor laser comprises:

an active region for generating the gain of a laser beam,

a diffraction grating formed in said active region, and

front and back surfaces between which said active region is interposed, wherein

the front end surface has a reflectivity of 1 percent or less,

the back end surface has a reflectivity of 30 percent or more when viewed

from the back end surface side toward the front,

the coupling coefficient κ of said diffraction grating is 100 cm⁻¹ or more,

the length L of said active region is 150 μ m or less, and
a combination of κ and L provides a $\Delta\alpha/g_{th}$ of 1 or more, where $\Delta\alpha$ is the
gain difference between modes and g_{th} is a threshold gain, and
the distributed-feedback semiconductor lasers have different wavelengths from one
another.

17. (currently amended): An optical module, ~~comprising that comprises the a~~ distributed-feedback semiconductor laser, ~~as defined in claim 1, wherein the distributed-feedback~~
semiconductor laser comprises:

an active region for generating the gain of a laser beam,
a diffraction grating formed in said active region, and
front and back surfaces between which said active region is interposed, wherein
the front end surface has a reflectivity of 1 percent or less,
the back end surface has a reflectivity of 30 percent or more when viewed from
the back end surface side toward the front,
the coupling coefficient κ of said diffraction grating is 100 cm^{-1} or more,
the length L of said active region is 150 μ m or less, and
a combination of κ and L provides a $\Delta\alpha/g_{th}$ of 1 or more, where $\Delta\alpha$ is the gain
difference between modes and g_{th} is a threshold gain.

18. (cancelled).

19. (cancelled).

20. (cancelled).

21. (currently amended): A distributed-feedback semiconductor laser as defined in claim 1,
further comprising wherein an external reflector is provided behind the distributed-feedback
semiconductor laser as defined in claim 1.

22. (cancelled).

23. (currently amended): An optical module, ~~that comprises the~~ comprising a distributed-
feedback semiconductor laser array, wherein

the distributed-feedback semiconductor laser array comprises a monolithic array of
distributed-feedback semiconductor lasers, and

each distributed-feedback semiconductor laser comprises:

an active region for generating the gain of a laser beam,

a diffraction grating formed in said active region, and

front and back surfaces between which said active region is interposed, wherein

the front end surface has a reflectivity of 1 percent or less,

the back end surface has a reflectivity of 30 percent or more when viewed

from the back end surface side toward the front,

the coupling coefficient κ of said diffraction grating is 100 cm^{-1} or more,

the length L of said active region is 150 μ m or less, and
a combination of κ and L provides a $\Delta\alpha/g_{th}$ of 1 or more, where $\Delta\alpha$ is the
gain difference between modes and g_{th} is a threshold gain, and
the distributed-feedback semiconductor lasers have different wavelengths from one
another as defined in claim 16.